UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte ROGER TIMMIS, MITCHELL R. TOLAND,
TIMNIT GHERMAY, WILLIAM C. CARLSON, and JAMES A. GROB

Appeal 2007-3264
Application 09/700,037
Technology Center 1600

Decided: September 11, 2007

Before TONI R. SCHEINER, DONALD E. ADAMS, and ERIC GRIMES,
Administrative Patent Judges.

GRIMES, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims to a method for sorting plant embryos. The Examiner has rejected the claims as nonenabled and lacking adequate written description. We have jurisdiction under 35 U.S.C. § 6(b). We reverse the rejection for inadequate written description but affirm the rejection for nonenablement.

BACKGROUND

"Reproduction of selected plant varieties by tissue culture has been a commercial success for many years" (Specification 1). The predominant approach to conifer tissue culture is somatic embryogenesis, in which

> an explant, usually a seed or seed embryo, is placed on an initiation medium where it multiplies into a multitude of genetically identical immature embryos. . . . [T]he immature embryos are placed on a development or maturation medium where they grow into somatic analogs of mature seed embryos. These embryos are then individually selected and placed on a germination medium for further development.

(*Id.* at 1-2.) "[T]he selection from the maturation medium of individual embryos suitable for germination . . . is a skilled yet tedious job that is time consuming and expensive" (*id.* at 2).

The Specification discloses a method for automated sorting of embryos. The method is "based on classification of plant embryos by the application of classification algorithms to . . . absorption, transmittance, or reflectance spectra of the embryos" (*id.* at 3).

> The classification of embryos according to quality . . . by the spectrometric measurements comprises two main steps. The first is the development of a classification model, involving the substeps of development of training and cross validating sets. Spectral data is acquired from embryos or embryo regions of known embryo quality . . . and then a data analysis is performed using one or more classification algorithms to develop a classification model for embryo quality. The second main step is the acquisition of spectrometric data from an embryo whose quality is unknown, . . . followed by data analysis of the acquired spectral data using the classification model developed in the first main step.

(*Id.* at 12-13.)

DISCUSSION

1. CLAIMS

Claims 27-41 are pending and on appeal. The claims have not been argued separately and therefore stand or fall together. 37 C.F.R. § 41.37(c)(1)(vii). Claims 27 and 41 are representative and read as follows:

27. A method for classifying plant embryos according to their quantifiable characteristics comprising:

(a) developing a classification model by

(i) acquiring absorption, transmittance or reflectance spectral raw data of reference samples of plant embryos or any portion thereof of known quantifiable characteristics;

(ii) performing a data analysis by applying one or more classification algorithms to the spectral raw data, the data analysis resulting in development of a classification model for classifying plant embryos by their quantifiable characteristics;

(b) acquiring absorption, transmittance or reflectance spectral raw data of a plant embryo or any portion thereof of unknown quantifiable characteristics; and

(c) applying the developed classification model to the spectral raw data of step (b) in order to classify the plant embryo of unknown quantifiable characteristics according to its presumed quantifiable characteristics.

41. The method according to Claim 27, wherein the quantifiable characteristics comprise conversion potential, resistance to pathogens, drought resistance, heat resistance, cold resistance, salt tolerance, preference for light quality, or suitability for long-term storage.

Thus, claim 27 is directed to an automated method for classifying plant embryos. Spectral data are acquired from plant embryos having known characteristics and the data are used to develop a "classification model" for classifying other plant embryos. That is, the known samples are used to train a computer to recognize embryos having similar characteristics.

(Specification 12: 30-33 ("Spectral data is acquired from embryos or embryo regions of known embryo quality . . . and then a data analysis is performed using one or more classification algorithms to develop a classification model.")).

After a classification model has been generated based on known samples, it is applied to spectral data of a plant embryo of unknown characteristics, in order to classify the unknown embryo "according to its presumed quantifiable characteristics"; i.e., the unknown embryo is classified as similar to or dissimilar from the embryos in the training set. (Specification 5: 20-27 (""The spectral raw data collected from the embryo of unknown quality is . . . applied directly to the embryo quality classification model. . . . [T]he application of the unknown spectral data to the classification model allows classification of the quality of the plant embryo of unknown plant embryo quality.")).

Claim 41 specifies that the "quantifiable characteristics" can be conversion potential (i.e., likelihood to germinate; Specification 7: 31-33); resistance to pathogens, drought, heat, or cold; salt tolerance; preference for light quality; or suitability to long-term storage (i.e., storage of the embryos themselves; Specification 8: 1). These characteristics are referred to generically as "plant embryo quality" in the Specification (*id.* at 7: 33 to 8: 2).

2. WRITTEN DESCRIPTION

Claims 27-41 stand rejected under 35 U.S.C. § 112, first paragraph, as lacking an adequate written description in the Specification. The Examiner finds that

> Appellant has demonstrated that one can take embryos which are visually determined to be good (an old and well known process), expose the embryos to certain electromagnetic wavelengths (e.g. NIR), collect the raw spectral data produced by said exposure and then take that data and apply well known data processing algorithms to interpret the data and produce a "classification model." It is not in the creation of a such a model that appellant has failed to adequately describe or enable . . . their claimed invention but in the application of said model. As such, the invention as a whole has not been adequately described or enabled.

(Answer 5.)

The Examiner takes the position that the Specification does not describe the claimed method via actual reduction to practice because "at no point does applicant's specification clearly show that [applicants] selected a particular embryo based on their classification model and that said embryo reacted (i.e. germinated) in such a way as predicted by the model" (*id.*). The Examiner also finds that the Specification does not describe the claimed method in any other way adequate to show possession (*id.* at 5-6). Finally, the Examiner finds that the description is inadequate because "there is nothing to convey to one of skill in the art that the properties in claim 41 could be reasonably predicted using a spectral classification model (*id.* at 7).

We will reverse this rejection. The Examiner finds that the Specification does not show actual reduction to practice or otherwise describe the method sufficiently to show possession. However, the Specification describes the claimed method in general terms (e.g., Specification 5) and provides a working example of using the method to classify embryos based on likelihood to germinate (*id.* at 36-45). The Specification reports that the method correctly classified 79% to 100% of

tested embryos (see Tables 7-11). Therefore, the Examiner erred in finding that the Specification does not provide an adequate written description of the process defined by claim 27.

The Examiner also argues that the claims lack adequate descriptive support because the Specification does not describe how to classify embryos according to the properties recited in claim 41 using spectral data (Answer 6-7).

In a nutshell, the Examiner's reasoning seems to be that the Specification does not describe this aspect of the claims because it does not provide any working examples showing classification with respect to the properties recited in claim 41. Lack of working examples, however, is not an adequate basis for a written description rejection. *See Falkner v. Inglis*, 448 F.3d 1357, 1366, 79 USPQ2d 1001, 1007 (Fed. Cir. 2006) ("[E]xamples are not necessary to support the adequacy of a written description[;] . . . the written description standard may be met . . . even where actual reduction to practice of an invention is absent).

Here, the Specification describes the claimed method generally, provides working examples of classifying embryos based on likelihood to germinate, and states that the method can be used to classify embryos based on the qualities listed in claim 41 (*id.* at 7-8). The Examiner has not adequately explained why the description provided in the Specification does not meet the written description requirement of 35 U.S.C. § 112, first paragraph.

3. ENABLEMENT

Claims 27-41 also stand rejected under 35 U.S.C. § 112, first paragraph, as nonenabled. The Examiner relies in part on the same reasoning used to support the written description rejection: After explaining the rejection for lack of adequate description, the Examiner concludes that

> [i]t follows logically that the claimed invention has not been enabled by the instant specification because applicant has not taught how to apply the instant invention such that one of skill in the art could predict using applicants' classification model . . . whether or not any embryo would germinate or have one of the other "characteristics" as in claim 41.

(Answer 7.)

With one exception, we agree with Examiner's reasoning and his conclusion that the Specification does not enable practice of the full scope of the claimed method without undue experimentation.

We disagree with the Examiner's conclusion that more than routine experimentation would be required to use the claimed method to classify embryos on the basis of germination potential. The Specification states:

> Differences in spectral data collected from embryos of high quality (for example, high conversion potential or high morphological similarity to normal zygotic embryos) versus those of low quality are presumed to reflect differences in chemical composition that are related to embryo quality. Numerous studies assert that embryo quality is related to gross chemical composition of the embryo or its parts, especially the amounts of water and storage compounds (proteins, lipids, and carbohydrates).

(Specification 11.) The Specification cites several research papers that are said to support this statement (*id.* at 12).

The Specification also provides working examples of using spectral data to classify embryos "known to differ considerably in germination vigor" (*id.* at 36: 6-7). The results of each of the working examples state that the method correctly classified most of the tested embryos (Tables 7-11). The Specification concludes that "analysis of spectral data from somatic embryos having high- and low-quality morphological appearance provides a basis for developing a classification model that will allow somatic embryos to be rapidly categorized with regards to their germination potential" (*id.* at 42: 20-23).

Thus, the evidence of record appears to show that the claimed method can be practiced using spectral data to classify embryos as more likely or less likely to germinate into plants. In light of the guidance and working examples presented in the Specification, the Examiner has not adequately explained why undue experimentation would be required to use the claimed method to classify embryos according to their germination potential.

However, we agree with the Examiner's conclusion that the claims are nonenabled because the Specification provides inadequate guidance with respect to classifying embryos on the basis of characteristics other than germination potential using the claimed method (Answer 6-7). Claim 41, for example, makes clear that the "quantifiable characteristics" recited in claim 27 include "resistance to pathogens, drought resistance, heat resistance, cold resistance, salt tolerance, preference for light quality, [and] suitability for long-term storage."

The Specification provides no guidance regarding what spectral features of embryos are associated with any of these characteristics. Nor

does the Specification provide any working examples that show the use of embryo spectral data to classify plant embryos according to any characteristic other than likelihood to germinate. In fact, the evidence of record does not show that there exist any features of plant embryo spectral data that can be used to classify embryos as resistant to pathogens, drought, etc. Therefore, we agree with the Examiner that using the claimed method to classify plant embryos according to characteristics other than likelihood to germinate would likely require undue experimentation on the part of those skilled in the art.

Appellants argue that

> the present invention is *not* directed to requiring to first identify a particular set of parameters or data that can be always used as indicative of specific quantifiable characteristics of plant embryos. . . .
>
> To the contrary, the present invention is directed to developing a classification model . . . without requiring first identifying what parameters or data are indicative of specific quantifiable characteristics.

(Br. 11-12).

Essentially, Appellants' argument is that they have disclosed a method of training a computer to recognize spectral characteristics of embryos that are most likely to germinate; if it turns out that there are also spectral characteristics of embryos that are pathogen resistant, drought resistant, etc., then their patent should cover teaching computers to recognize them, too, even though Appellants haven't disclosed (presumably because they don't know) what to train the computer to look for.

We disagree. "Patent protection is granted in return for an enabling disclosure of an invention, not for vague intimations of general ideas that

may or may not be workable. . . . Tossing out the mere germ of an idea does not constitute enabling disclosure." *Genentech Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1366, 42 USPQ2d 1001, 1005 (Fed. Cir. 1997).

Here, Appellants have disclosed a method for using spectral data to classify plant embryos according to their likelihood to germinate. They have not, however, disclosed a method for using spectral data to classify plant embryos according to any other quantifiable characteristics. With respect to classifying embryos according to pathogen resistance, drought resistance, etc., the specification discloses nothing more than a general idea that may or may not be workable. That does not constitute an enabling disclosure and we affirm the rejection of claims 27-41 for lack of enablement.

SUMMARY

We reverse the rejection for lack of written description but affirm the rejection of claims 27-41 for lack of enablement.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

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WEYERHAEUSER COMPANY
INTELLECTUAL PROPERTY DEPT., CH 1J27
P.O. BOX 9777
FEDERAL WAY WA 98063